Public Health Leadership Failure – Flint

By

Mahendra Katta

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Rohit Ramaswamy, PhD
Date:

David Steffen, DrPH
Date:

Abstract

This paper is an analysis of leadership failures that led to the water crisis in the city of Flint, Michigan. The objective of this paper is to discuss common public health leadership frameworks, policies and principles and analyze how the failure by key stakeholders to adhere to these principles and practices led to lead contamination of drinking water supplies in Flint, Michigan. Recommendations on how to strengthen leadership skills that are key to prevention of public health calamities are provided.

KEYWORDS: **Leadership failure**, **Lead Poisoning**, **Public Health Infrastructure**

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BLL……. Blood Lead Levels

CDC…….Centers for Disease Control and Prevention

CNN……Cable News Network

DSWD…. Detroit Sewage and Water Department

DEQ…… Department of Environmental Quality

EBA…… Educational Business Article

EBLL …..Elevated blood Lead Levels

EFM……Emergency Financial Manager

EPA…. …Environmental Protection Agency

GIS……..Geographic Informational Systems

GM……. General Motors

MCDEQ...Michigan Department of Environmental Quality

NIH…… National Institutes of Health

WHO…...World Health Organization

WLL……Water Lead Levels

Background

Flint was the auto industry hub until it lost the manufacturing jobs that may have led to high rate of unemployment. In 2011, Michigan Governor Rick Snyder appointed an emergency financial manager to handle Flint's budget (Hawkins, 2016). Ever since Michigan took over Flint's finances in 2011, it has been trying to cut costs whenever possible (Hawkins, 2016).

The Flint Water Crisis began in April 2014 when the city switched its water supply from Lake Huron to the Flint River (CNN Library, 2016) as a cost-saving measure (Hawkins, 2016). However, several environmental disasters (from automakers, chemical, coal and agriculture industries) over the course of the century played a systemic role in contamination of the Flint River over a prolonged period, leading to this current tragedy (Wahowiak, 2016). As reported by WIBC News, "A 2011 study found that before water from the Flint River could be considered potable, it would need to be treated with an anti-corrosion agent" (CNN News, 2016) that would cost the state about hundred dollars per day and could have prevented ninety percent of Flint's water problems (Silverman, 2016). However, in 2014, the water source was switched to the Flint River without any pre-water treatment. The switch was meant to be a temporary solution until the state-run supply line to Lake Huron was ready for connection in about two years.

Residents of Flint complained about water quality for eighteen months**.** Several households in Flint started complaining about changing water color, taste and unpleasant smell that was coming from the household taps. Most affected households were using boiled water for cooking meals and wearing surgical gloves as an extra layer of protection when cleaning dishes to prevent further contact with lead. Residents have been installing home water filters and stocking up on bottled water for drinking. The city had issued a mandate to boil and filter the tap

water for E.coli contamination but did not serve a timely notice for “Trihalomethanes” which are considered carcinogenic by the EPA (Greeson, 2015).

Soon after Flint made its ill-fated switch to Flint River water from the costlier Detroit municipal system, officials at General Motors engine plant started complaining about corrosion of engine parts caused by high levels of chloride in the treated river water. “The water was rusting the engine blocks” and there was “visible corrosion and damage on parts coming out of the machining process” (Colias, 2016). As a result GM used several water purifications methods such as reverse osmosis, (costly purification process) and also trucked in additional water to dilute chloride levels. The remediation efforts proved time consuming and costly for General Motors (Colias, 2016).

It was noted that higher levels of chloride in Flint River water was linked to leaching of lead from the aging pipes (Fonger, 2015). In December 2015 the mayor of Flint declared the city to be in a state of emergency. Flint has since returned to the water source from Lake Huron. However, lead contamination has yet to return to safe levels (Hanna-Attisha, LaChance, Sadler & Schnepp, 2016). According to Abernathy et al. (2016), “the city of Flint now faces a daunting infrastructural problem: find which homes are most drastically a affected by lead contamination and repair their plumbing systems” (p. 1). Abernathy et al. also stated that “homes with lead service lines are at the highest risk of contamination, and it is estimated that Flint has over 8,000 such service lines” based on the article by Dolan in the Detroit Free Press (Abernethy, et al, 2016, p. 1; Dolan, M., 2016). This problem has gathered significant national attention, and the city of Flint is now under pressure to repair the infrastructure issues and help those affected by lead poisoning as quickly and efficiently as possible.

The story of this city illuminates a larger problem: the state of infrastructure in American cities. The plumbing systems in American cities were put in place as part of a sanitation movement to make indoor plumbing a possibility, reducing the possibility of epidemic outbreaks and as part of early public health movement (Wahowiak, 2016). “But the systems that are in place are old” (Jacobs 2016, Wahowiak, 2016), and were starting to show wear. Estimates of the cost of fixing water infrastructure in Flint, such as aging pipes, may cost billions of dollars, excluding any public health costs of the disaster.

Changes in Health Outcomes Resulting from Poor Water Quality:

There were increased rates of Legionnaires disease and lead toxicity among Flint residents from June 2014 onwards. There have been a total of eighty seven cases of Legionnaire’s disease and nine deaths reported in Genesee County, where Flint is located. (Jackman, 2016). The corrosive water created growing conditions for Legionnaire’s bacteria which caused a dramatic increase from the typical six to thirteen annual cases that would typically be reported (Nelson, 2016).

In September 2015, Hurley Medical Center in Flint released a study “confirming that the proportion of infants and children with elevated levels of lead in their blood had nearly doubled since the city switched water sources from Detroit water system to the Flint River” (Hanna-Attisha, LaChance, Sadler & Schnepp 2016). Hanna-Attisha and colleagues used the Hurley Medical Center hospital records and “found a steep rise in blood-lead levels corresponding to the city's switch in water sources” (Hanna-Attisha, LaChance, Sadler & Schnepp 2016). Hanna-Attisha et al noted that their research found that the average proportion of Flint children with elevated blood-lead levels or EBLL (above five micrograms per deciliter, or 5×10^{-6} grams per 100 milliliters of blood) rose from 2.4% (2013, before the change in water source) to 4.9%

(2015, after the change in water source), and in some hotspot areas rose from 4% to 10.6 %. Michigan Childhood Lead Poisoning Prevention Program data agree that an increase occurred, suggesting an increase from 2.2% of children (May 2013-April 2014) to 3.0% (May 2014-April 2015)" (Hanna-Attisha, LaChance, Sadler & Schnepp 2016). Hanna-Attisha et al., stated "By comparison, outside of Flint water, the change in EBLL was not statistically significant (0.7% to 1.2%; $P > .05$). In high WLL [water lead levels] Flint, EBLL increased from 4.0% to 10.6% ($P < .05$)" and the results of the GIS analyses showed that these were clustered within the Flint city limits (Hanna-Attisha, LaChance, Sadler & Schnepp, 2016, p.285). The areas with the highest water lead levels strongly coincide with the areas with the highest predicted blood lead levels [Hanna-Attisha, LaChance, Sadler, Schnepp 2016, figure 1].

Hanna-Attisha et al. stated, based on a Centers for Disease Control and Preventive (CDC) report, that "lead is a potent neurotoxin and childhood lead poisoning has an impact on many developmental and biological processes, most notably intelligence, behavior and overall life achievement" . Lead poisoning has a disproportionate impact among low income and minority children (Hanna-Attisha, LaChance, Sadler, Schnepp 2016). .

According to the World Health Organization (WHO), high blood lead levels are especially harmful to children and pregnant women, and can cause "learning disabilities, behavioral problems and mental retardation." (WHO, 2016). As stated by Hanna-Attisha et al., "Flint children already suffer from risk factors that innately increase their lead exposure: poor nutrition, concentrated poverty, and older housing stock." and "increased lead-poisoning rates have profound implications for the life course potential of an entire cohort of Flint children already saddled with toxic stress contributors (e.g., poverty, violence, unemployment, food insecurity)." (p.286)

Leadership Failure in Flint:

The water crisis in Flint and its effect on communities was primarily due to choices taken by the leadership and weak public health infrastructure. The governor executed a controversial financial management law to achieve certain cost objectives for the city of Flint. The leadership failed in Flint due to inadequate testing of the water source, lack of alternative safe drinking water source and a lack of collaboration with non-governmental partners, such as public health and environmental experts- who would have provided non-biased feedback and would have represented the best interests of Flint residents.

The poor outcomes were due to the combination of poor policies and weakened public health infrastructure where both leaders and followers wanted to implement a vision that was destined for failure, since key decisions were taken by few stakeholders who did not have the expertise to make an informed decision about changing the water source.

The key element for elected leaders is to focus on service first and then on fiscal objectives as a secondary vision. In the case of Flint, it would be useful to examine the kinds of leadership styles that were employed (or not employed) and how these resulted in the crisis situation. This paper reviews different leadership styles and assesses the extent to which the use, lack of use, or misuse of these styles were apparent in Flint. It is hoped that this analysis will assist future leaders and policy makers in avoiding the mistakes that were made and the devastating consequences to the residents of an already impoverished city.

A Description of Leadership Styles:

A leader is defined by his/her ability to focus on knowledge, skills, and values that demonstrate how he or she can become more capable in his or her ability to lead others (Ulrich

and Smallwood, 2007). According to Ulrich and Smallwood, leaders should motivate, engage and have a strategy to implement the changes they intend to accomplish. In this paper, three key styles of leadership: authoritative, adaptive and collaborative, will be discussed to show why these styles are important at all levels of government to bring the changes needed so that we can succeed as a community and country.

Authoritative leadership gives orders and directives. According to Candy (2013), "authoritative leadership style is also about control where leader seeks little feedback from the subordinates. There is no real sense of empowerment in this style of leadership approach as authoritative leaders fail to recognize skills and abilities, denying the followers the opportunities to participate in decision making etc. Authoritative leaders typically have strong knowledge and this particular style of leadership works best when followers lack understanding and knowledge of policies".

Adaptive Leadership: Adaptive leaders build on the foundations and ensure continued success in process and policies, while simultaneously regulating process and policies that are no longer helping the cause, whether it is government, organization or communities. Adaptive leadership creates opportunities so that others within the government or the organization can flourish in new ways and in more challenging environments (Heifetz, 2009). Heifetz describes "adaptive challenges vs technical work" within the framework of adaptive leadership as two distinct aspects.

Adaptive challenges are not easy to identify and often face challenges from within an organization to bring the changes. As a result implementation of technical side of problem solving gets delayed. Heifetz states that the key mistake that a leader can make is to confuse a simpler technical problem with a more complex adaptive issue. An expert can identify and define

a technical problem and the established steps to solve it, if the leader can follow and execute the feedback. The more complex, adaptive issues have no quick fixes or tried and true templates to follow. At first the leader brings in all the relevant stakeholders to jointly understand the issue and its importance and meaning to other stakeholders. Then the adaptive leader orchestrates the development of responsibility and leadership by providing a safe haven for dialog, but along with the talking, is mutually agreed upon high expectations of learning, growing, and evolving into a group that can successfully differentiate between technical and adaptive issues and addresses each appropriately.

Adaptive challenges could only work when leaders identify the root cause of a problem, rather than dealing with its symptoms and may take longer time to implement. Adaptive leaders are courageous, recognize and utilize others who think differently, and view challenges as opportunities (Govindarajan, 2016).

Collaborative leadership is a shared leadership practice between two individuals or organizations (co-leadership). Collaborative leaders follow and share the reins. During the course of collaboration, "leadership takes the form of mentorship and successional leadership, and at other times as complementary partnership" (Clark, 2008, p24). Collaborative leadership requires "teams of leaders working on common objectives and need to demonstrate inclusivity in today's complex, ever-changing organizations to achieve their vision" (Clark, 2008, p 24). Although inclusivity requires an awareness and sensitivity to the needs of others from leaders, this softer side of co-leadership is not considered "yielding" and hence collaborative leaders are tough minded and resilient. Collaboration usually involves organizations sharing both goals and resources.

A summary of these leadership styles is shown in Table 1.

Table 1: Summary of Authoritative, Adaptive and Collaborative Leaders:

Leadership Qualities	**Authoritative**	**Adaptive**	**Collaborative**
Authority	Leader directs and enforces	usually without formal authority	usually without formal authority
Focus of development	Little feedback is sought or given to followers. "Follow me; I will show you what you are working on"	Is on all stakeholders Lets take responsibility for our part of the problem; learn about it and each other and then jointly find solutions and answers to this issue we face together"	Building partnerships Let's combine our efforts and resources to reach some of the goals we have in common.
Learning	have stronger knowledge base and are quick learners.	Learning through stakeholder defining problems and solutions.	Learning though mentorship and also as follower and collaborator
Key process and actions	Key decisions concerning process and task are made by leaders with little consultation from followers	Tests routine practices through innovation Shared responsibility for defining and addressing issues, opportunities or problems.	Invests in strong personal relationships at all levels.
Keys to success	Getting the job done at all costs without	are based on leadership perseverance, cross cultural respect and finding common	Inclusivity, build energy and passion into leadership.

	examining the morale of followers.	ground with key stakeholders.	Coalition building

In government organizations there is a need for multiple leadership styles in order to allow policy flexibility and increase productivity, especially in government organizations where local policies can get entangled in red tape. Leaders need to evolve and seek new avenues to bring the best results for the community it is serving in response to emerging challenges. As we describe later, what we saw in Michigan state leadership was a lack of innovative leadership, a commitment to political ideology, inflexibility in decision making and lack of systems thinking approaches among key stakeholders. These stakeholders are described below.

Flint Stakeholders:

A stakeholder is defined as an individual who can impact an outcome based on decisions he/she made. There are several key stakeholders involved in Flint that were responsible for causing the elevated levels of lead in the drinking water supplies. The primary ones that we will focus on in this paper are the Governor, Flint emergency financial manager/s (appointed by the governor), the Michigan Department of Environmental quality (MCDEQ), the Mayor of Flint and the Flint city council.

According to the National Governors Association website,, the role of the Governor is to "implement state laws and oversee the operations of the state executive branch. Governors can advance and pursue new and revised policies and programs using a variety of tools such as executive orders, executive budgets, legislative proposals and vetoes both at state and local levels. Governors carry out their management and leadership responsibilities and objectives with

the support and assistance of departments and agency heads" (National Governors Association, n.d, p1). In September 2011, the Governor of Michigan took the initiative to appoint an emergency financial manager to review Flint's financial state and provide a report.

The purpose of the emergency financial manager was to make financial decisions ranging from city wide services to overseeing other key responsibilities of local stakeholders to ensure Flint's budget stayed within allocated revenue targets. The emergency manager was "intent on executing a plan to save money by switching the source of the city's water from the Detroit water system to a new pipeline being built from Lake Huron, using the Flint River as an interim source" (Kozacek, 2016).

The Michigan Department of Environmental Quality *(*MCDEQ) was the agency responsible for evaluating plans to get the Flint Water Treatment plant up and running when the water source was switched in April 2014 (Counts, 2016). The DEQ misinterpreted federal guidelines and did not make corrosion control part of the plan that led to the lead contamination of drinking water supplies.

The Mayor of Flint and city council are responsible for overseeing day to day operations ranging from city-wide services such as law, water (quality, source and treatment), sanitation, transportation and recycling, among other public services.

Other secondary stakeholders included Genesee county commissioners, Detroit Sewage and Water Department (DSWD), Flint residents and Flint businesses. We will not focus on these stakeholders in this paper.

Analysis of Stakeholder Actions from a Leadership Perspective:

The primary thesis of this paper is that a failure in leadership led to actions among the key stakeholders that resulted in the Flint water crisis. To understand how these occurred, we analyze the stakeholder actions against the characteristics of the leadership styles identified in tables 2, 3 and 4.

Table 2: Analyzing the Actions of the **Michigan Governor:**

Leadership Style	**Key Characteristics (what a leader should do)**	**Stakeholder Actions (What the stakeholder did)**
Adaptive	Organizational change by implementing gradual and meaningful changes to policies by incorporating stakeholder viewpoints	Lack of good judgment and unable to anticipate risks led to a calamitous policy outcome. Example for this was appointing EFM and empowering him to make decisions without seeking stakeholder or community opinion.
Authoritative	Dictates and enforces policies	Made key decisions from a political perspective without seeking scientific expertise.
Collaboration	Seek partnerships	The governor collaborated with EFM but never sought the opinion of public health and

		environmental health experts.

Table 3: Analyzing the Actions of **Flint Emergency Financial Manager (EFM):**

Leadership Style	**Key Characteristics (what a leader should do)**	**Stakeholder Actions (What the stakeholder did)**
Adaptive	Organizational change by implementing gradual and meaningful changes to policies by incorporating stakeholder viewpoints.	Higher rate of job turnover among EFM's. Couldn't facilitate the change that's required for adaptive leadership. Part of this can be attributable to the governor and local politics.
Authoritative	Dictates and enforces policies	Made decision to switch the water source without taking any feedback.
Collaborative	Seek partnerships	Lack of effective partnership with public health experts and department of environmental quality led to poor judgment to switch the water source without first measuring water quality.

Table 4: Analyzing the Actions of Flint **MCDEQ**

Leadership Style	**Key Characteristics (what a leader should do)**	**Stakeholder Actions (What the stakeholder did)**
Adaptive	Organizational change by implementing gradual and meaningful changes to policies by incorporating stakeholder viewpoints.	Lack of expert opinions and unable to collaborate with all levels of government to bring meaningful change.
Authoritative	Dictates and enforces policies	Lack of political support hinders leadership in regulatory agencies to implement environmental policies.
Collaboration	Seek partnerships	Should have consulted public health experts or private partnerships

Analysis Summary and Discussion:

1. The leaders in Flint handled key issues by using authoritative style leadership as very few stakeholders were involved in the decision to change the water source from Lake Huron to Flint River. In case of Flint, time and financial resources were a factor, the task to

implement a change in water source and save resources was a priority as there was little time for planning and seeking feedback from public health partners.

2. Leaders in Flint and Michigan should have taken a different approach by showcasing adaptive and collaborative styles of leadership. Adaptive and collaborative style provides leaders time to evaluate the public health and environmental aspects when making policy decisions.
3. Leaders should always try to collaborate with public health and environmental health experts for their feedback to achieve objectives. Such collaboration minimizes the risk to community health.
4. Leadership in Flint, Michigan lacked preparedness and judgment to address an ethical and public health issue it has created. It is essential that leaders in both government and regulatory agencies need to collaborate and be prepared to make ethical decisions.
5. Lack of effective communication and acknowledgement between government and regulatory agencies led to public health consequences that impacted both health (Legionnaire's disease has resulted in hospitalizations and in some cases even fatal outcomes) and infrastructure.
6. The government did not coordinate to setup a local command and control center that was needed to facilitate an emergency response and preparedness to address the water crisis and health needs for those affected with lead poisoning.
7. Lack of public health training within government and regulatory agencies about public health principles has weakened the public health infrastructure in Flint.

8. Leaders with in the government need to approach public health issues through collaboration. Since policy makers and regulatory agencies are influencing the scope of public health, it is important that they seek public health experts.

Analysis of stakeholder actions (based on data obtained from local households, health care providers and businesses) suggested that leadership did not collaborate with public health and environmental experts to seek additional feedback about risks associated with changing the untested water source. There was no incentive on the part of the leadership to tackle tough challenges as leaders were aware that the Flint River was not used as a drinking water source for the last fifty years, yet they decided to switch the water source without any risk assessments or taking actions to pre-treat the water. The water from DWSD has been reliable and could have extended the lease for another few years, but the immediate cost savings were much more important for the leadership than the risks associated with providing untreated and unreliable water as a drinking water source to the Flint communities. Their actions have led to a leadership failure and the costs to rebuild the community now far exceed the costs associated with generating their savings

The actions and inactions of government and regulatory agencies actions led to water contamination and poor health outcomes (Silverman, 2016). Political leaders and regulatory authorities have continually misled the people that water was safe in spite of reported problems with water quality. As a result of lack of acknowledgement by the people in leadership roles, many children and vulnerable adults suffered from lead poisoning due to high levels of lead in the untreated water that was coming out of the faucets. The failure of the government to add anti-corrosives and pre-treat the drinking water is a sign of leadership failure considering how low it

would have cost ($100 per day) explains the lack of systems thinking approach by the leaders in government and regulatory agencies.

Leaders need to approach any public safety and public health issue with a "systems thinking approach", but the government's ineptitude to seek public health expertise and its inability to make ethical decisions have led to lead poisoning of Flint residents. One of the objectives of the state leadership was the fiscal responsibility which was reasonable but acted without risk assessment of key public health and environmental policy decisions. The purpose of the state was to save city revenue, but certain decisions were taken without considering the impact it would have on public health. The state and local leadership have failed to predict the consequences of their political actions on the overall public health, and the investment that would be required to update that infrastructure of Flint's water supply lines will overtake the cost of savings.

Going beyond Flint: Building Public Health Infrastructure:

"The success or failure of any government must be measured by the well-being of its citizens. Nothing can be more important to a state than its public health". (Roosevelt, 1932, National Institutes of Health, 2010)

The framework of public health infrastructure constitutes the workforce competencies, the communication and information systems and organizational capacities to execute essential services within a community to meet the basic needs of its residents. The infrastructure is the base of public health practice that enables various entities within the public health system to function both independently and in partnership mode (Baker, Potter, Jones Mercer, Cioffi &

Green, 2005). Public health infrastructure ensures implementation and maintenance of public health services and programs.

Public health infrastructure is critical to national health as it helps respond to both short term and long-term public health needs. As a result, we need to identify public health infrastructure weaknesses and then legislate policies and plans at the federal, state and local levels to safeguard the communities. "When the components of public health infrastructure are strong, the system can carry out its core functions and essential services with uniform effectiveness. But when the components are weak, inconsistent, or deficient, the system's capacity to function likewise is at risk." (Baker, Potter, Jones Mercer, Cioffi & Green, 2005, p. 306). "Factors such as inadequate workforce, fragmented and precarious public funding, uneven and antiquated legal foundation, inconsistent application of informational technologies and organizational deficits are many of the causes of weaknesses in public health infrastructure" (Baker, Potter, Jones Mercer, Cioffi & Green, 2005, p 307, 308, 309).

The complex issues surrounding public health infrastructure are creating new challenges for leaders across all aisles. In order to continue developing future leaders, we need to focus on public health educational programs (through accredited universities), competency training and workshops for non-public health officials to help them understand the importance of public health practice and the strategies that are needed for providing appropriate leadership training. The skills learned through workshops, and educational qualifications, are effective ways to promote various leadership styles that are required to guide organizational behavior and cultivate inter-organizational relationships. Leadership should apply scientific knowledge to public health problems and should have the vision to build and sustain community coalitions and integrate public health leaders into key governmental roles for policy implementation. Leaders

within government and public health should comprehend core scientific disciplines, organization theory, training in ethics and social justice so that they understand that ethical decisions are more important and override decisions based on fiscal objectives (Halverson, Mays, Kaluzny, House, 1997).

Successful development of public health leadership requires the evaluation of qualified workforce and health and safety information systems. As the public health workforce represents an essential component of the public health infrastructure, evaluation of workforce composition and competency is vitally important to future success. The evaluation framework should include the definition of a public health professional, and as Baker & Koplan wrote "the availability of data sources that provide a consistent categorization of the workforce, and support for researchers to conduct a systematic, nationwide (or statewide) assessment of the workforce. Much progress has been made in recent years in developing methods and in conducting direct assessments of workforce composition and competency" (Baker & Koplan, 2002, p. 17; Kennedy & Moore). Further, Baker & Koplan stated that "[a]t the core of this workforce framework are official public health agencies that are surrounded by a variety of other workforce settings, including private nonprofit associations, educational institutions, health services industry, private industry, community-based organizations, and other public-sector settings" (Baker & Koplan, 2002, p. 18; Kennedy & Moore, 2001). Lack of governmental legislation, responsiveness and inconsistent funding can hinder public health response and preparedness due to lack of infrastructure capabilities that are required to prevent and protect community and environmental health.

"Information and communications systems are vital to effective public health practice as tools to share information across jurisdictions, provide access to practice guidelines and

protocols, support distance learning, facilitate disease surveillance, and alert practitioners to public health threats and emergencies" (Baker & Koplan, 2002, p18). Unfortunately, the state of the public health information infrastructure has been shown to be weak and is a sign of major weaknesses in the nation's public health infrastructure. So strengthening public health information sharing data systems will enhance public health infrastructure at all levels and will increase our ability to prevent an epidemic or threat of bioterrorism.

The public health crisis in Flint has alerted us once again that our faith in government is eroding as the government is failing to provide basic human services that are required for a functional community. What we saw in Flint, Michigan was the lack of adaptive, strategic, collaborative and leadership styles as certain key stakeholders never consulted the public health experts, nor do they have the expertise to make the kind of assessments required when changing a water source that has so been so reliable for over half a century. It is imperative that leadership style within government should be more adaptable, flexible and mitigate public health risks and place the importance of community health as number one priority, especially in a changing world when everything is scrutinized.

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